

(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property
Organization
International Bureau



Rec'd PCT/PTO



(43) International Publication Date
18 March 2004 (18.03.2004)

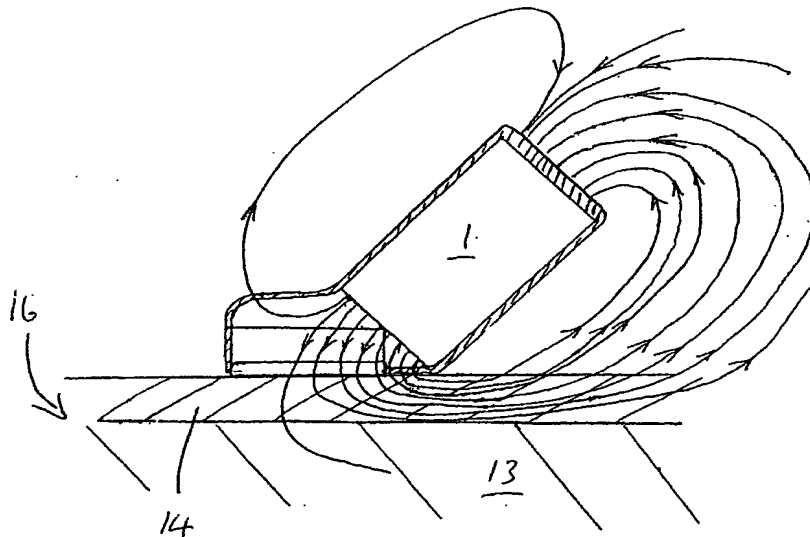
PCT

(10) International Publication Number
WO 2004/023133 A1

- (51) International Patent Classification⁷: G01N 27/72, G01B 7/02
- (21) International Application Number: PCT/EP2003/007997
- (22) International Filing Date: 22 July 2003 (22.07.2003)
- (25) Filing Language: English
- (26) Publication Language: English
- (30) Priority Data: 0216981.1 22 July 2002 (22.07.2002) GB
- (71) Applicant (for all designated States except US): BOREALIS TECHNOLOGY OY [FI/FI]; P.O. Box 330, FIN-06101 Porvoo (FI).
- (72) Inventors; and
- (75) Inventors/Applicants (for US only): EDWIN, Emil [NO/NO]; Markveien 24, N-7043 Trondheim (NO). ARNESEN, Tore [NO/NO]; Sigurd Hoidahls vei 3A, N-7056 Ranheim (NO).
- (74) Agents: JACKSON, Robert et al.; Frank B. Dehn & Co., 179 Queen Victoria Street, London EC4V 4EL (GB).
- (81) Designated States (national): AE, AG, AL, AM, AT (utility model), AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ (utility model), CZ, DE (utility model), DE, DK (utility model), DK, DM, DZ, EC, EE (utility model), EE, ES, FI (utility model), FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK (utility model), SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.
- (84) Designated States (regional): ARIPO patent (GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PT, RO, SE, SI, SK, TR), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).
- Published:
— with international search report

[Continued on next page]

(54) Title: METHOD AND APPARATUS FOR DETERMINING THE THICKNESS OF A CHROMIUM DEPLETED ZONE OF A SURFACE REGION OF A STEEL MEMBER



(57) Abstract: The invention provides a method and apparatus for monitoring subsurface chromium depletion from a steel member, such as a pyrolysis pipe. In the harsh conditions of a pyrolysis furnace, chromium within the pipe 16 migrates towards the pipe surface which results in the formation of a chromium depleted layer 14. This layer can provide useful data about the condition and operation of the furnace. The degree of chromium depletion is measured by using a magnetic source of known strength to create a magnetic field in the surface region of the pipe 16. An estimate of the thickness of the chromium depleted layer 14 is determined from the resultant magnetic flux, which can be measured by a hall element arranged at substantially 45° to the longitudinal axis of the magnet.